

Summary of the June 2004 Water Quality Monitoring Event and Other Environmental Services for Lake Tonetta, Putnam County, New York

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Lake Tonetta

- Princeton Hydro was hired to conduct a monitoring program in 2004.
- This program included water quality monitoring, aquatic plant surveys and a fishery survey.
- Princeton Hydro is also preparing the permit application for the stocking of Lake Tonetta with sterile grass carp.

Water Quality Sampling Events

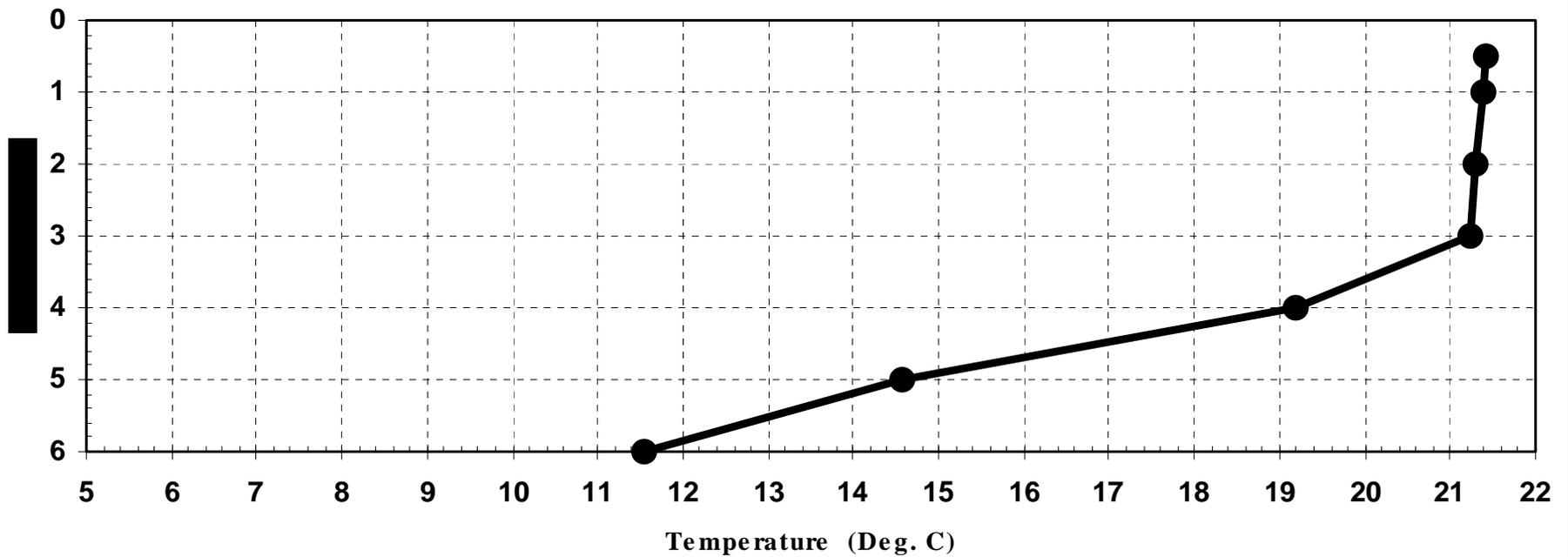
- Three sampling events will be conducted; the first was conducted on 14 June 2004.
- Assess current “health” of lake.
- Collect detailed ecological data on the lake prior to stocking sterile grass carp.
- Develop a baseline ecological database on the lake for its long-term management.

June Sampling Event

- Six sampling stations.
- *In-situ* data were collected with a Quanta meter (dissolved oxygen, pH, temperature and conductivity). Water clarity was measured with a Secchi disk.
- Discrete samples were collected for a variety of water quality parameters at the mid-lake sampling station.

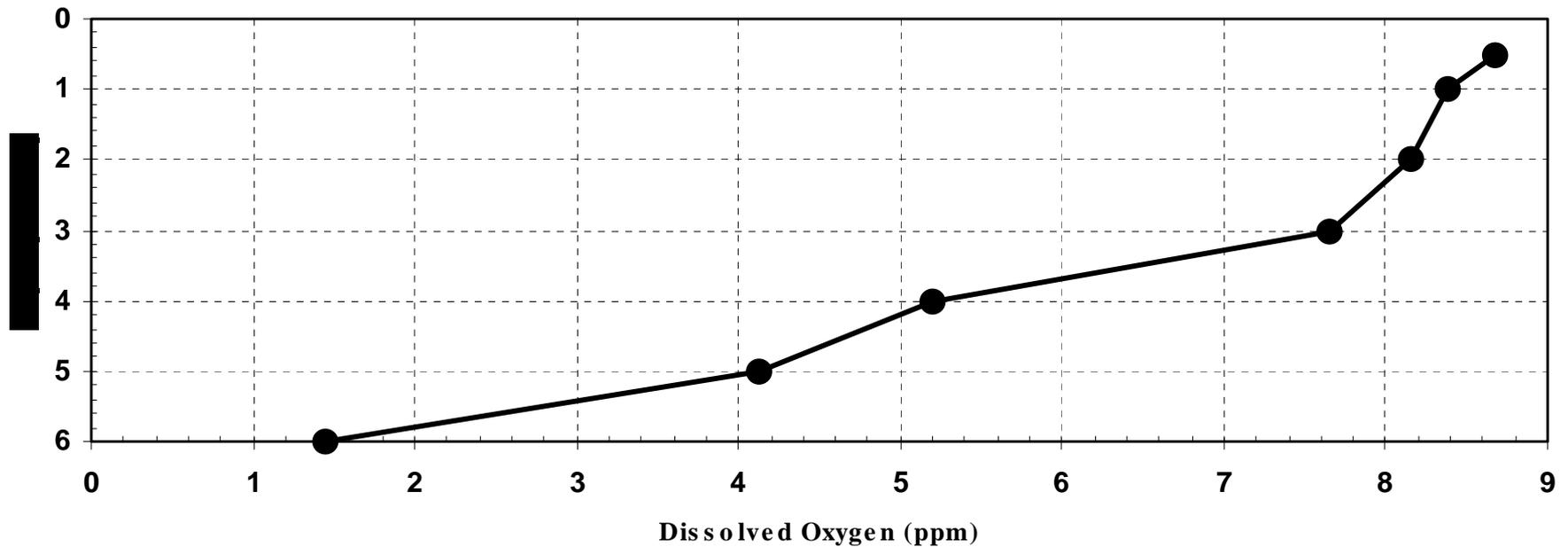
Temperature

Lake TONETTA Temperature Profiles on 14 June 2004



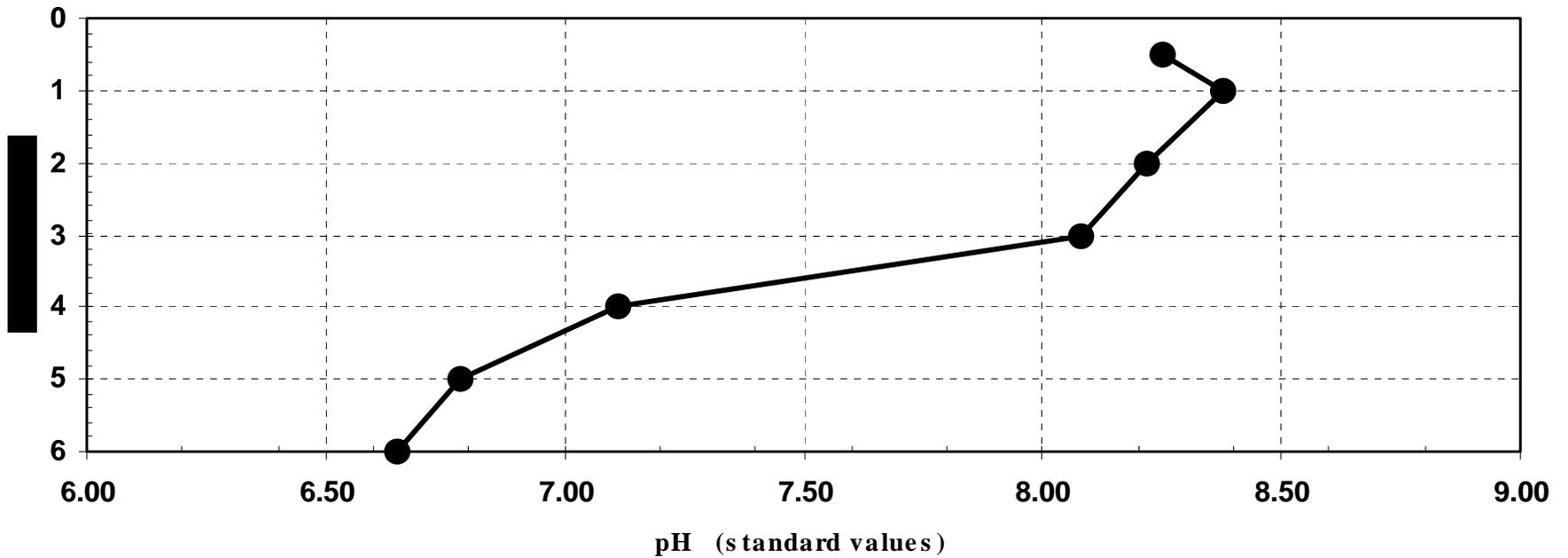
Dissolved Oxygen

Lake Tonetta Dissolved Oxygen Profiles on 14 June 2004



pH

Lake Tonetta pH Profiles on 14 June 2004



Alkalinity

- A measure of the capacity of water neutralize changes in pH.
- Most natural waters have alkalinities in the range of 20 to 200 mg of CaCO_3 per L.
- Lake Tonetta alkalinity in June was 87 mg of CaCO_3 per L.
- Thus, the lake is moderately buffered.

Nitrogen

- Nitrate-N and Ammonia-N are two forms of dissolved inorganic nitrogen that are utilized by algae and aquatic plants for growth.
- Nitrate-N concentration in Lake Tonetta in June was < 0.003 mg/L.
- Ammonia-N concentration in Lake Tonetta in June was < 0.02 mg/L.

Total Phosphorus

- Tends to be the primary limiting nutrient for most freshwater systems in the Mid-Atlantic States.
- In general, TP > 0.03 mg/L are indicative of eutrophic or productive waterbodies.
- Based on our in-house database, surface water TP concentrations > 0.06 mg/L will result in nuisance conditions (i.e. algal blooms / scums).

Total Phosphorus

- The surface water TP concentration in Lake Tonetta in June was 0.06 mg/L.
- The bottom water TP concentration in Lake Tonetta in June was 0.08 mg/L.
- These concentrations are indicative of elevated phosphorus concentrations.

Total Suspended Solids

- Total Suspended Solids (TSS) is a measure of the amount of “dirt” in the water.
- In general, TSS concentrations greater than 25 mg/L are perceived by most people as being dirty or turbid.
- The TSS concentration in Lake Tonetta was 3 mg/L.

Chlorophyll *a*

- Chlorophyll *a* is a photosynthetic pigment all algae possess.
- Measuring it is a means of quantifying the amount of algae in the water.
- Chlorophyll *a* concentrations greater than 30 mg/m³ are generally perceived as producing nuisance conditions (i.e. blooms / surface scums).

Chlorophyll *a*

- Chlorophyll *a* concentrations in Lake Tonetta in June was 2.5 mg/m³.
- In addition to measuring chlorophyll *a*, a sample was collected for the identification and enumeration of the phytoplankton (free floating algae).



Zooplankton

- These are the micro-animals that live in the open waters of lakes and ponds.
- Can provide as a natural means of controlling excessive algal growth.

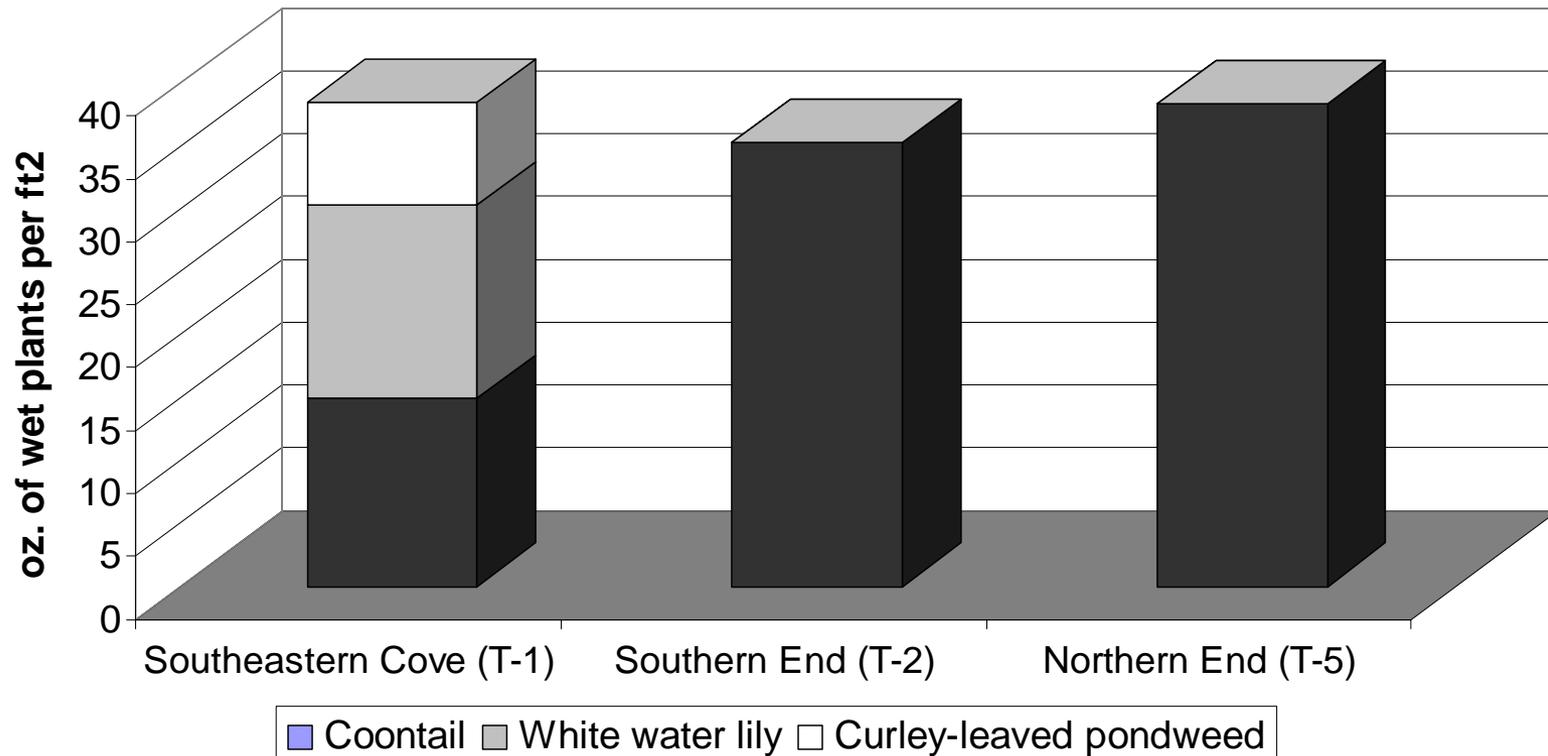


Aquatic Plants (Macrophytes)

- Samples were collected from each station. The above-sediment biomass was harvested, the plants were separated by species and the wet weight of each species was measured.
- Few or no plants were found in the deep sampling stations.
- High densities of rooted aquatic plants were found in the shallow sampling stations.

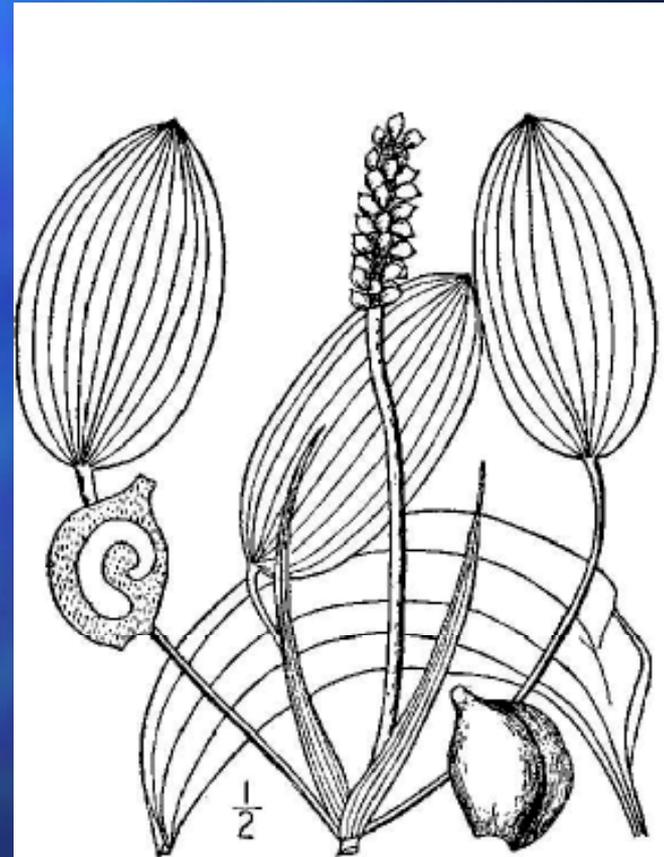
Lake Tonetta

Lake Tonetta - 14 June 2004



Other Macrophytes

- Eurasian watermilfoil
- Yellow water lily
- Filamentous mat algae



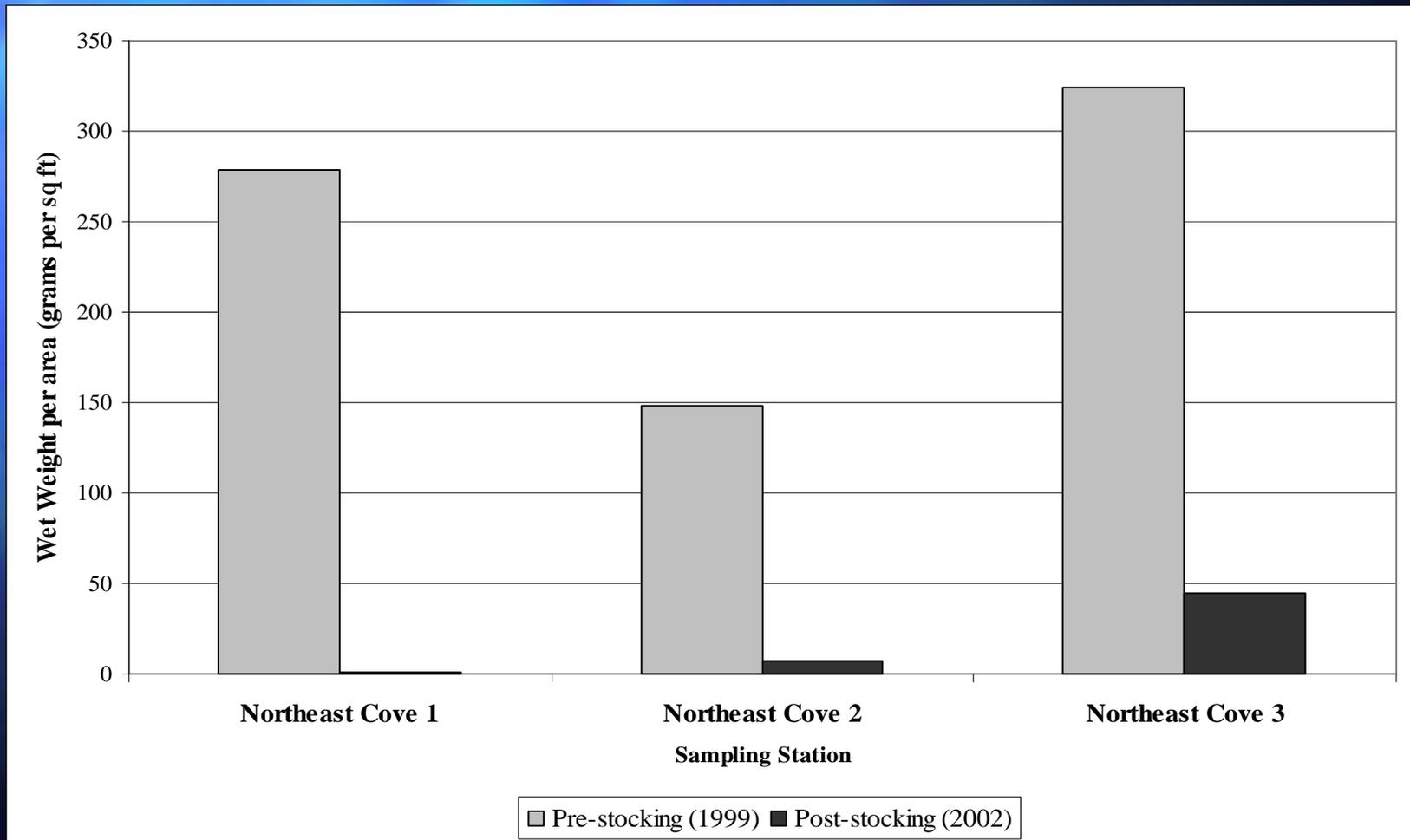
Management Actions

- The permit package is currently being prepared for the stocking of sterile grass carp in Lake Tonetta.
- The goal is to complete the permit process by the end of September / early October 2004, so sterile grass carp can be stocked in the lake in the spring of 2005.

Lake Carmel

- Based on a vegetated surface acreage of approximately 150 acres and a stocking rate of 10 fish per vegetated area, the total number of carp stocked in Lake Carmel was 1,500.
- The fish were added to the lake in August of 1999. The fish were between 10 and 14" in total length.

Lake Carmel – Northeast Cove



Lake Carmel

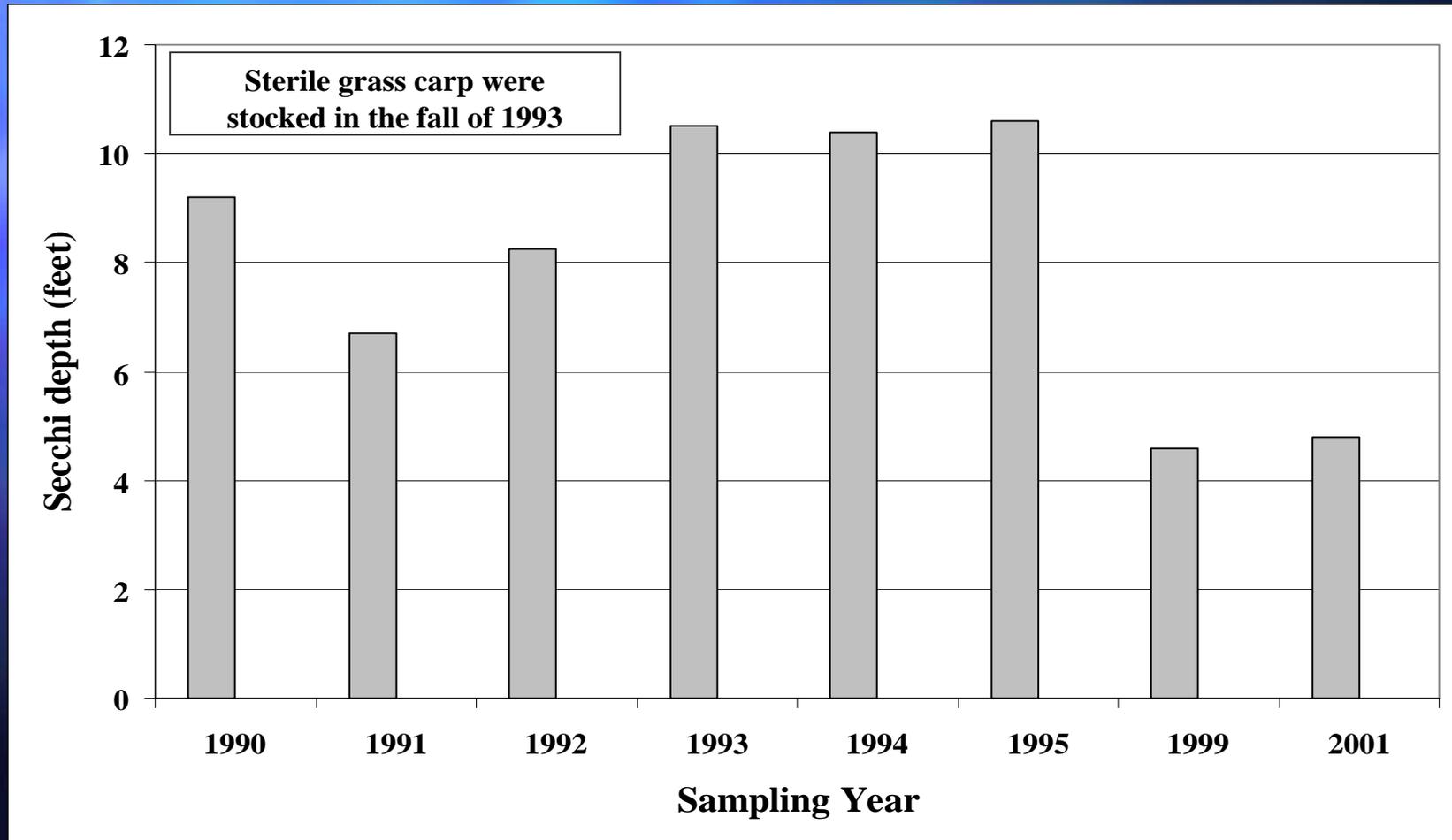
- Secchi depth during the Phase I Study in 1986 varied from 3.3 to 4.6 feet.
- Secchi depth during the August 1999 sampling event was 3.6 feet.
- Secchi depth during the September 2002 sampling event was 2.5 feet.



User Perception and Recreational Use

- Based on local accounts the moderate algal bloom began in early August 2002.
- Extremely high winds (white caps on the lake) on 11 September 2002 contributed toward the turbid conditions.
- In spite of existing conditions, the Town prefers current conditions over those experienced in 1999.

Lake Peekskill – Mean Water Clarity



Other Issues of Concern

- Baseline (dry) and stormwater sampling of the main inlet.
- Sampling / monitoring of inflow through wetlands.
- Inflow through the Atlantic White Cedar wetlands.
- Additional in-lake monitoring, including dissolved oxygen profiles and sampling of sediments.

Thank You

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